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(56) Documents cited
GB 2000013 A GB 1372985 A GB 1188869 A
US 4667370 A US 4634594 A US 3803669 A
US 3750231 A

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UK CL (Edition K) A1M, A2D, A2U
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(54) A turkey processing system

(57) Live turkeys are loaded into palletised containers at a turkey farm (10), each container having a number of open-topped drawers for reception of turkeys. The turkeys are transported to a turkey processing plant where they are removed from the containers and hung on a conveyor. Each turkey is delivered along the conveyor for slaughtering 25, plucking 27 and evisceration 28 followed by spray cleaning 29. Each turkey is then removed from the conveyor and trussed on a trussing table (30) having an open top of spaced-apart parallel bars which advantageously allows water to drain from the turkey whilst it is being tied. A number of trussed turkeys are mounted on hangers (40) suspended from an overhead rail for delivery to a blast chill room (42). Each hanger (40) has upright bars carrying a number of spaced-apart hooks arranged in staggered formation to allow good air circulation about turkeys mounted on the hooks for rapid and even cooling. Chilled turkeys are then delivered for packaging or for cooking prior to packaging. Each turkey is sealed in a plastics bag and a pair of bagged turkeys are sealed in an outer plastics bag that has been flushed with carbon dioxide and then placed in a cardboard box.

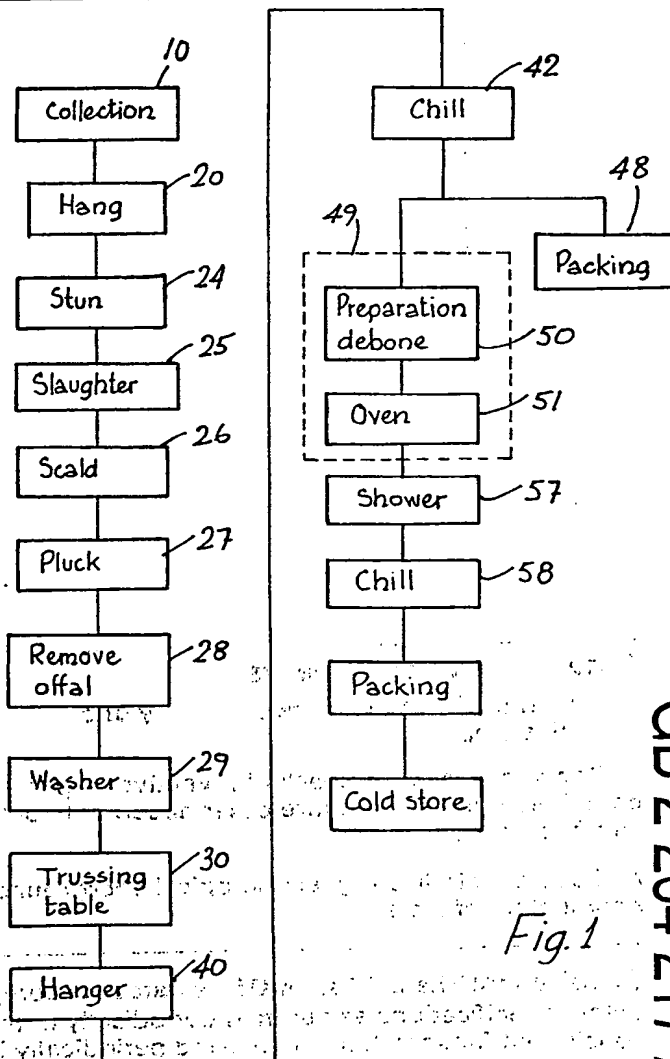


Fig. 1

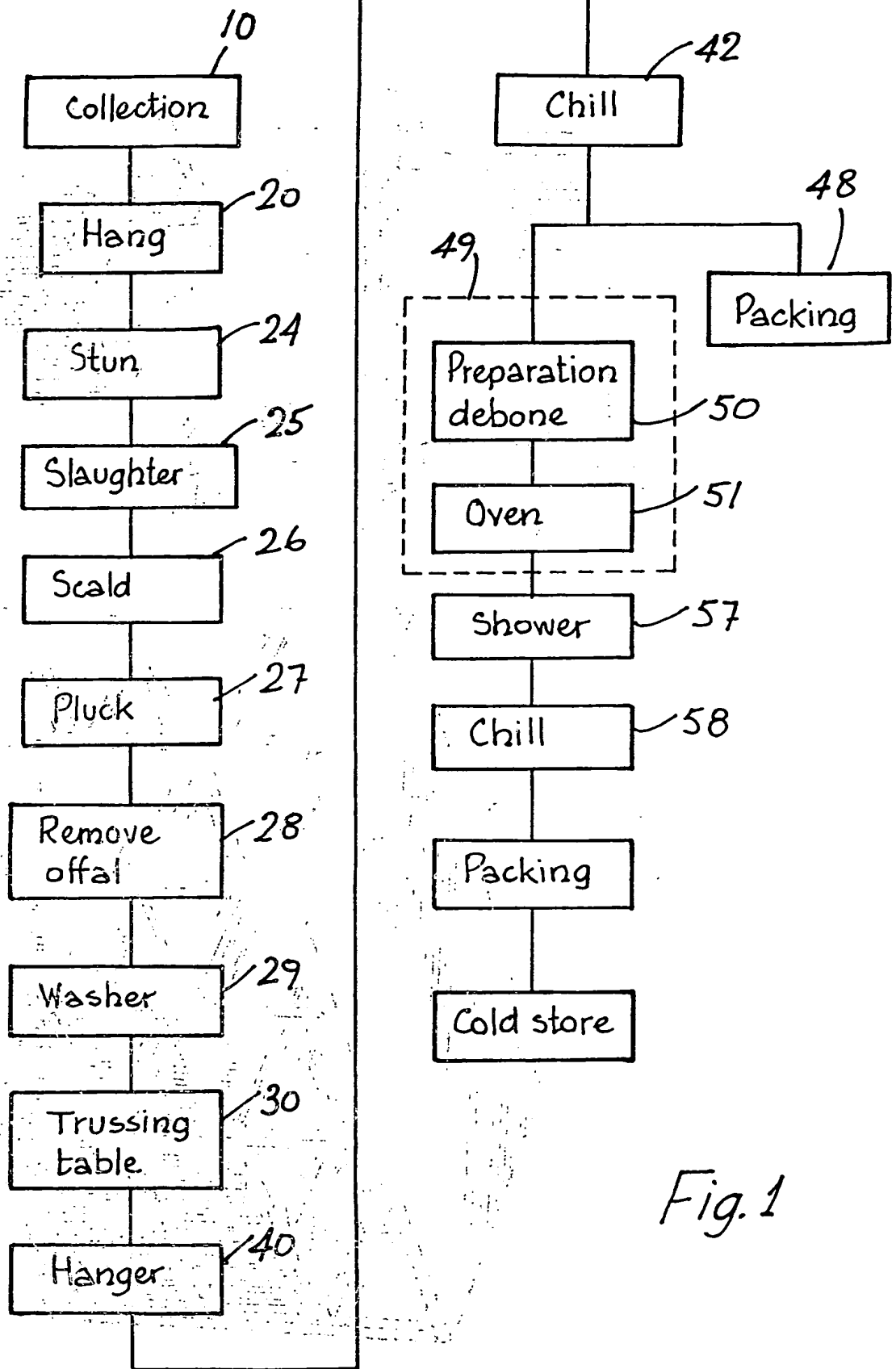
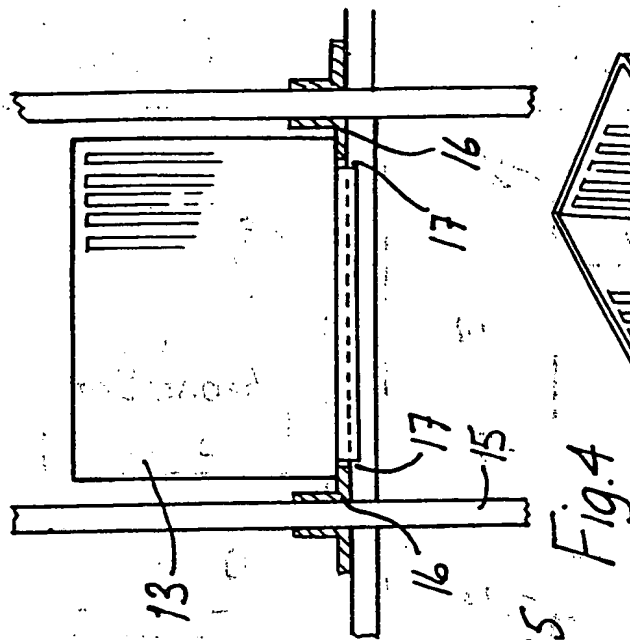
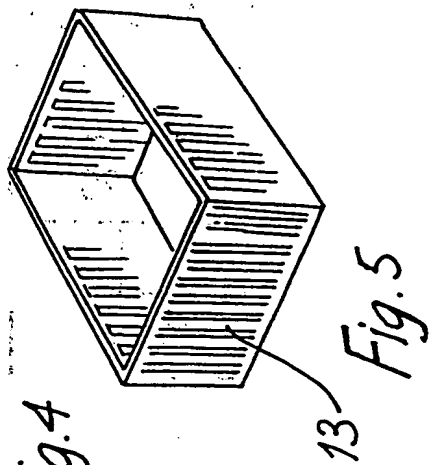
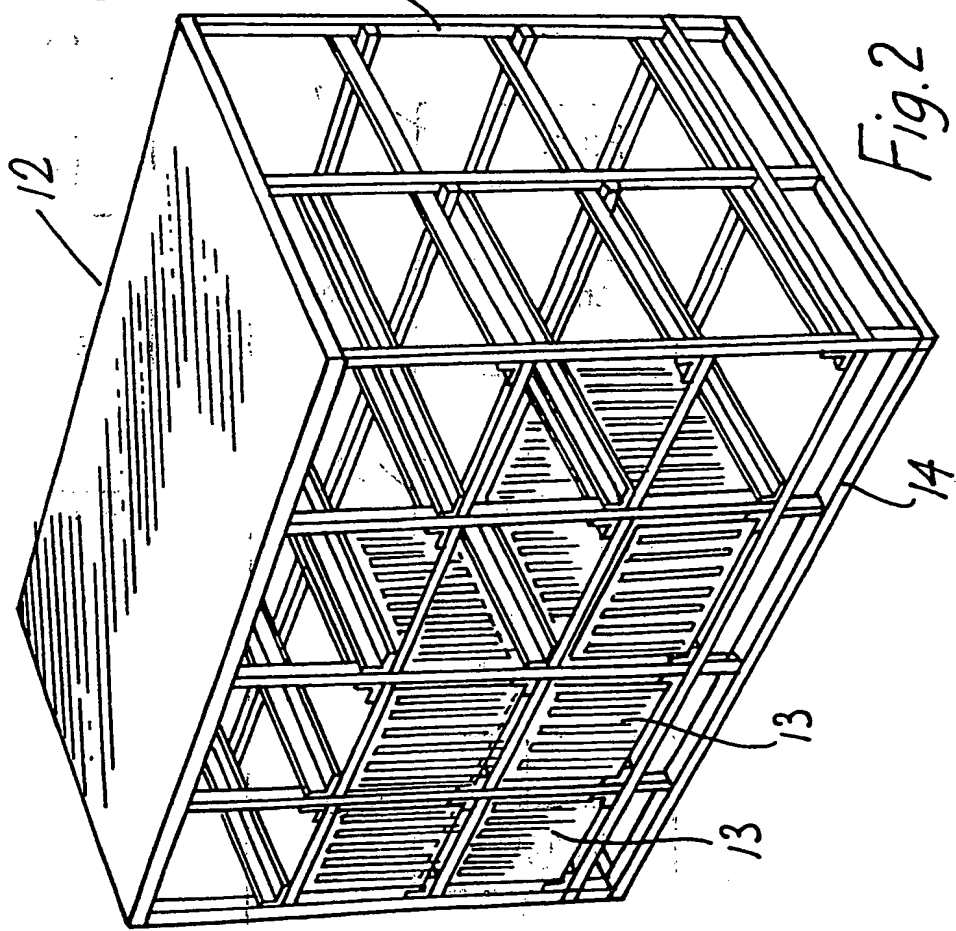
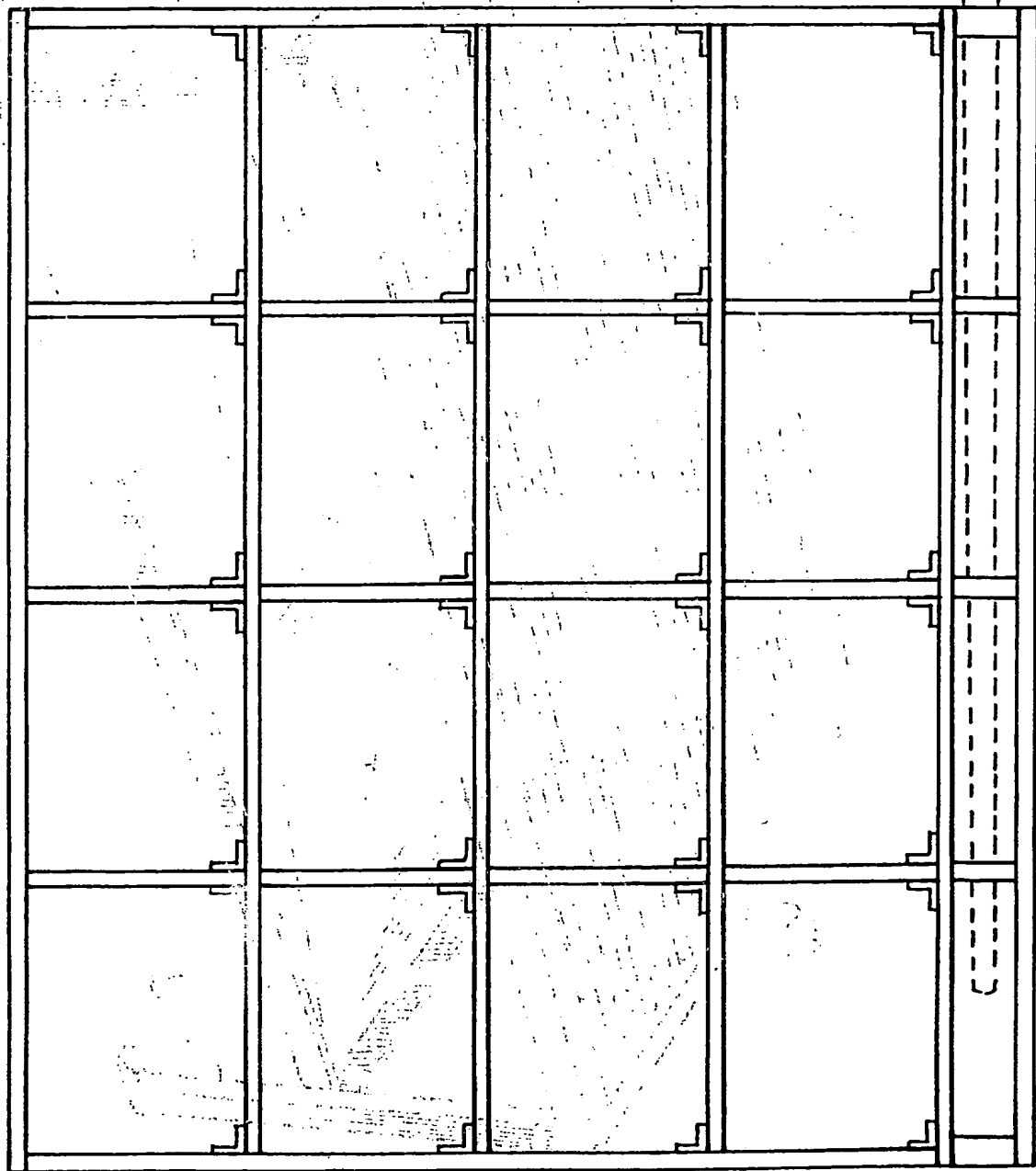
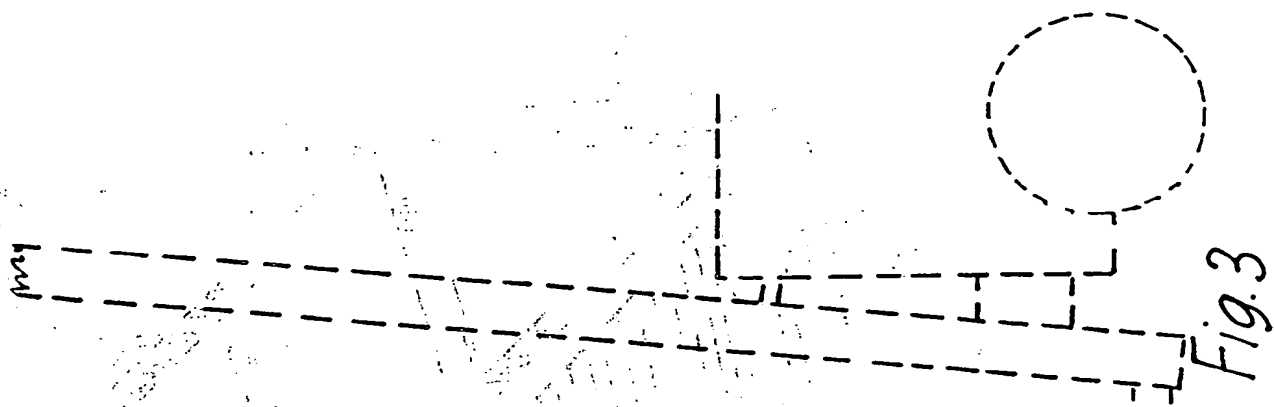


Fig. 1





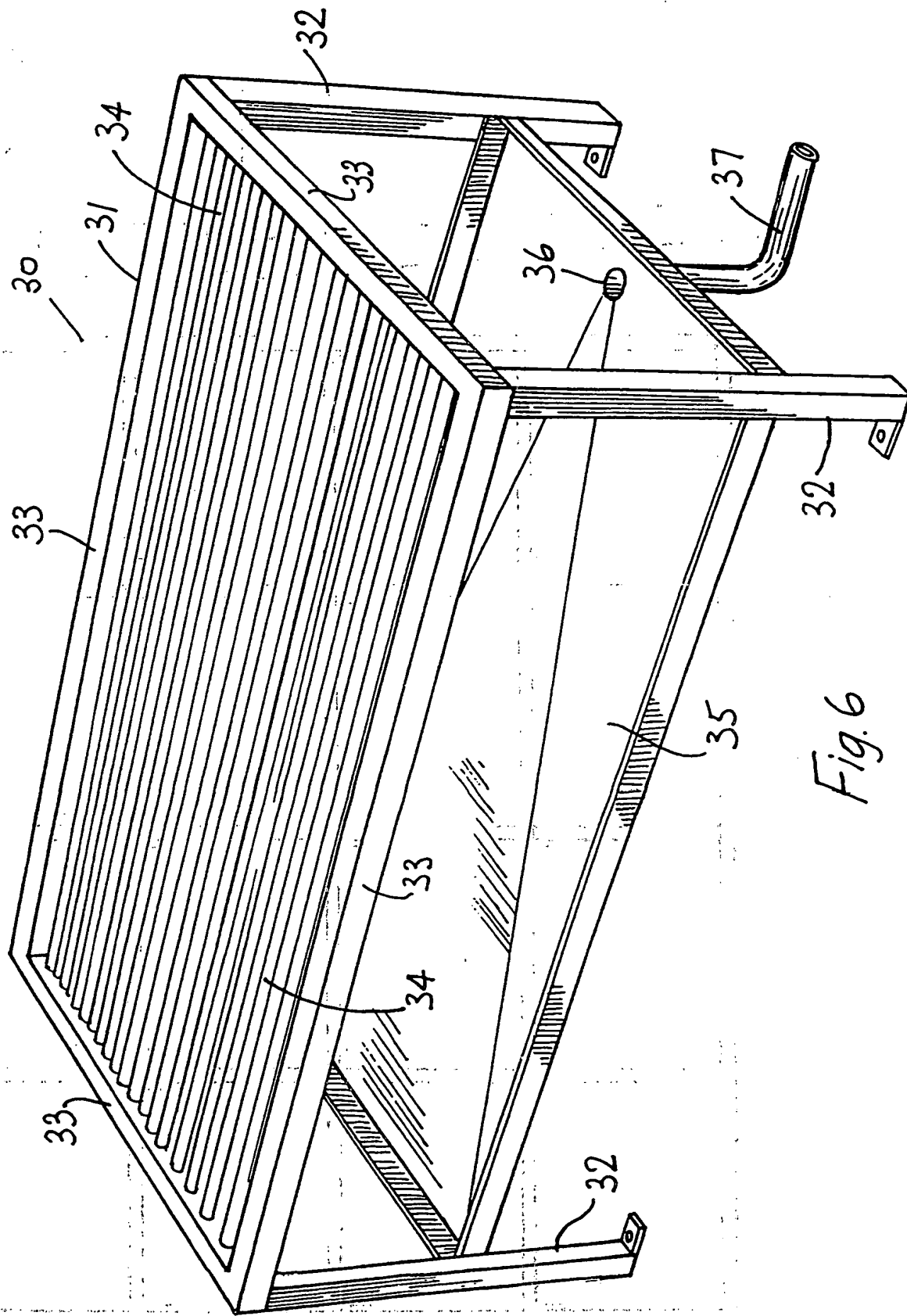


Fig. 6

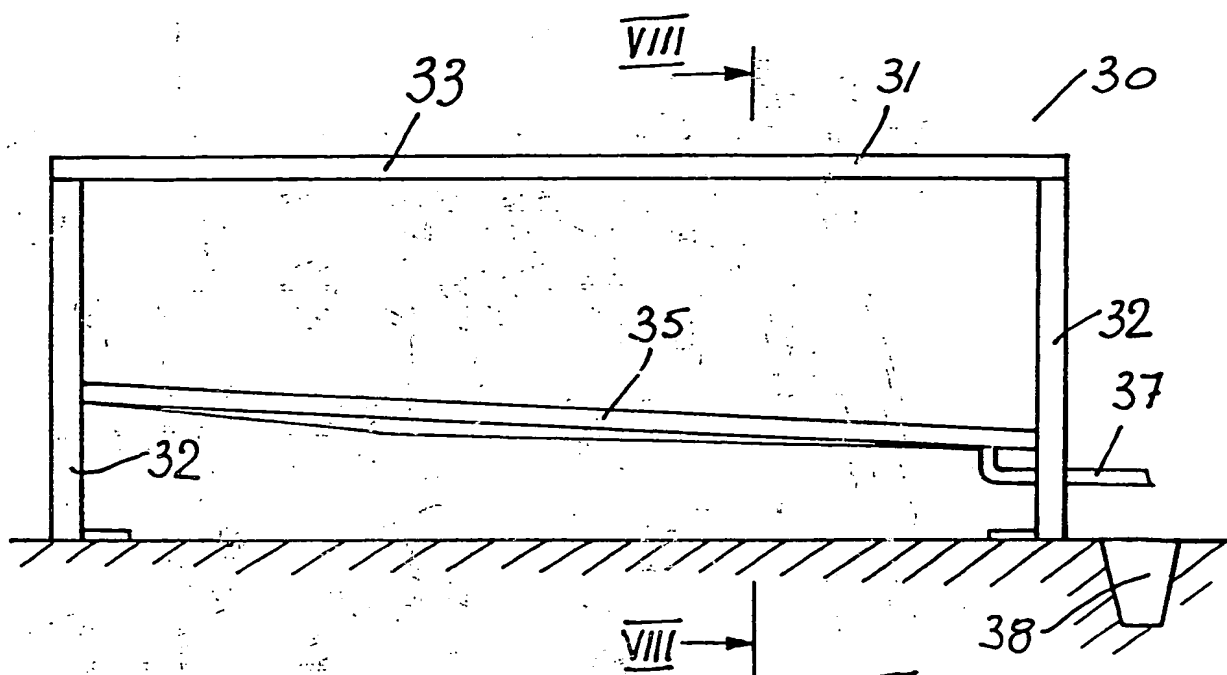


Fig. 7

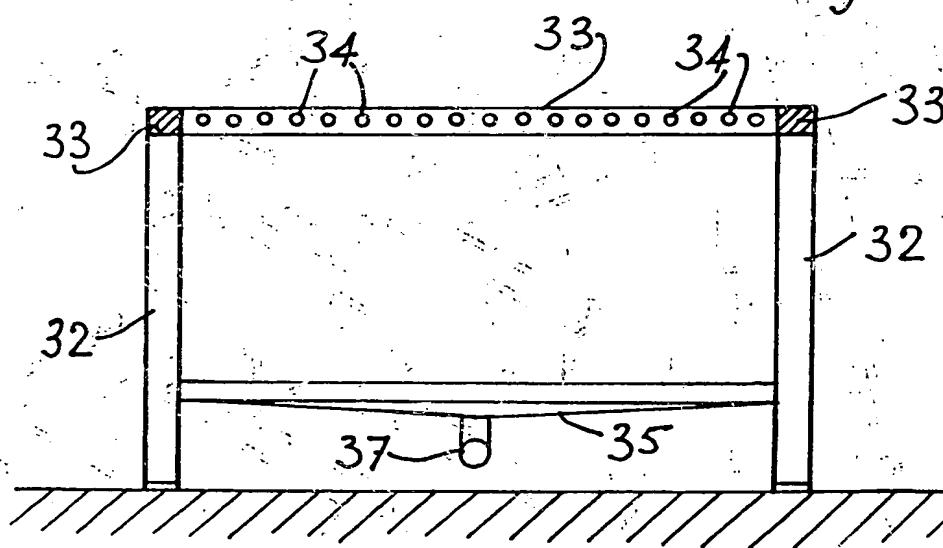


Fig. 8

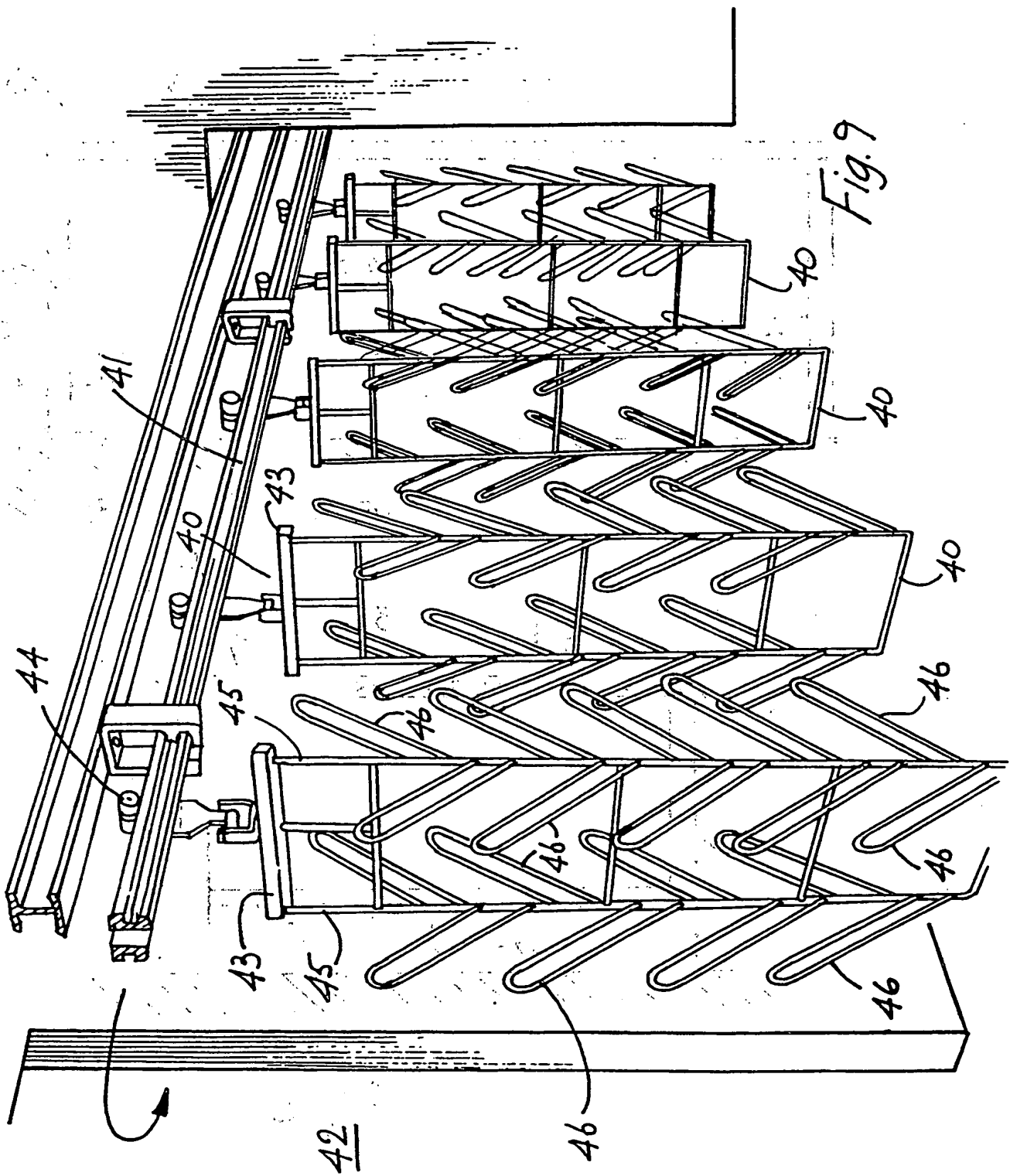
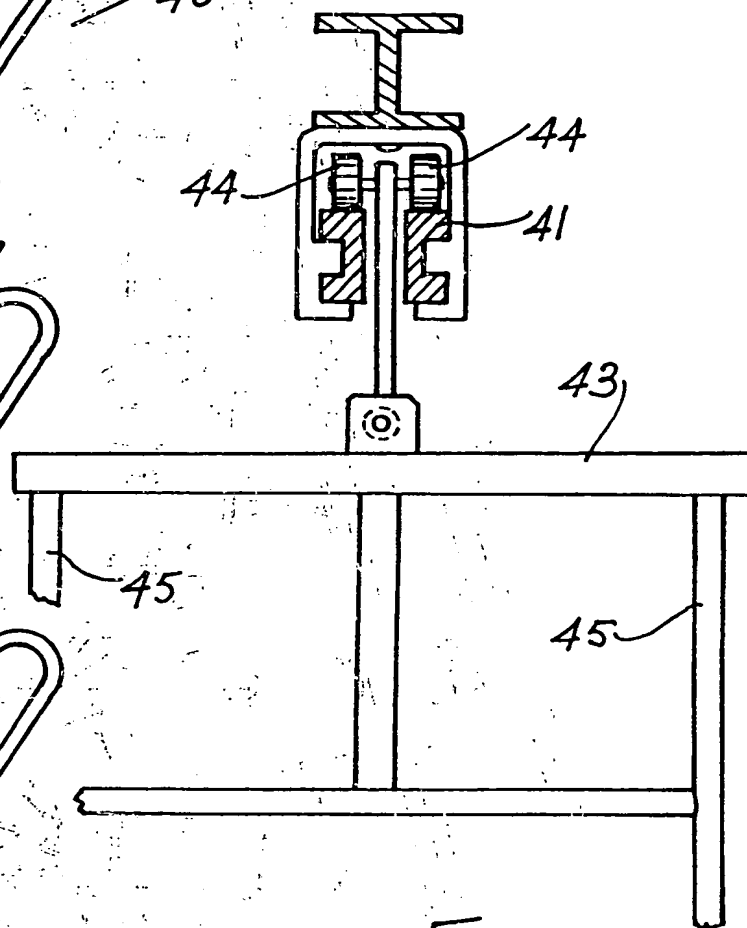
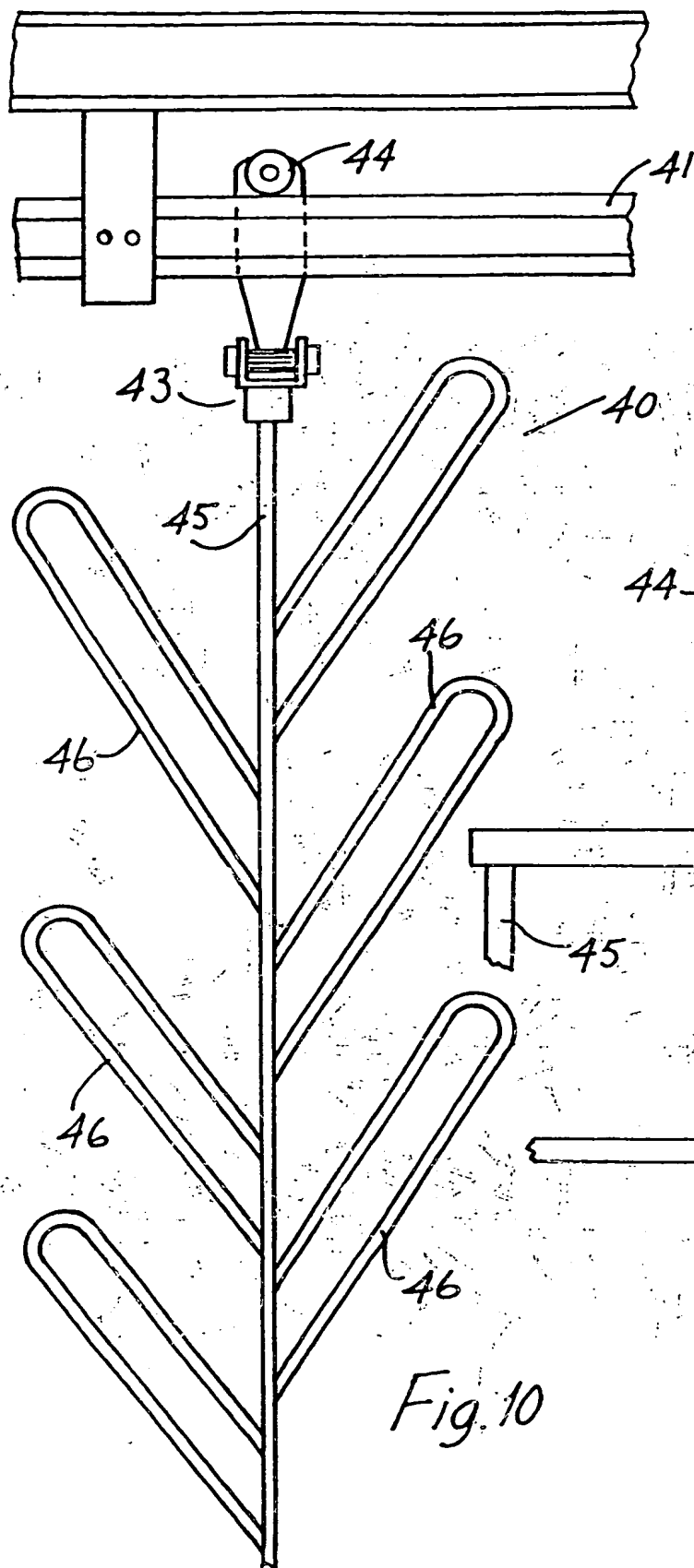


Fig. 9



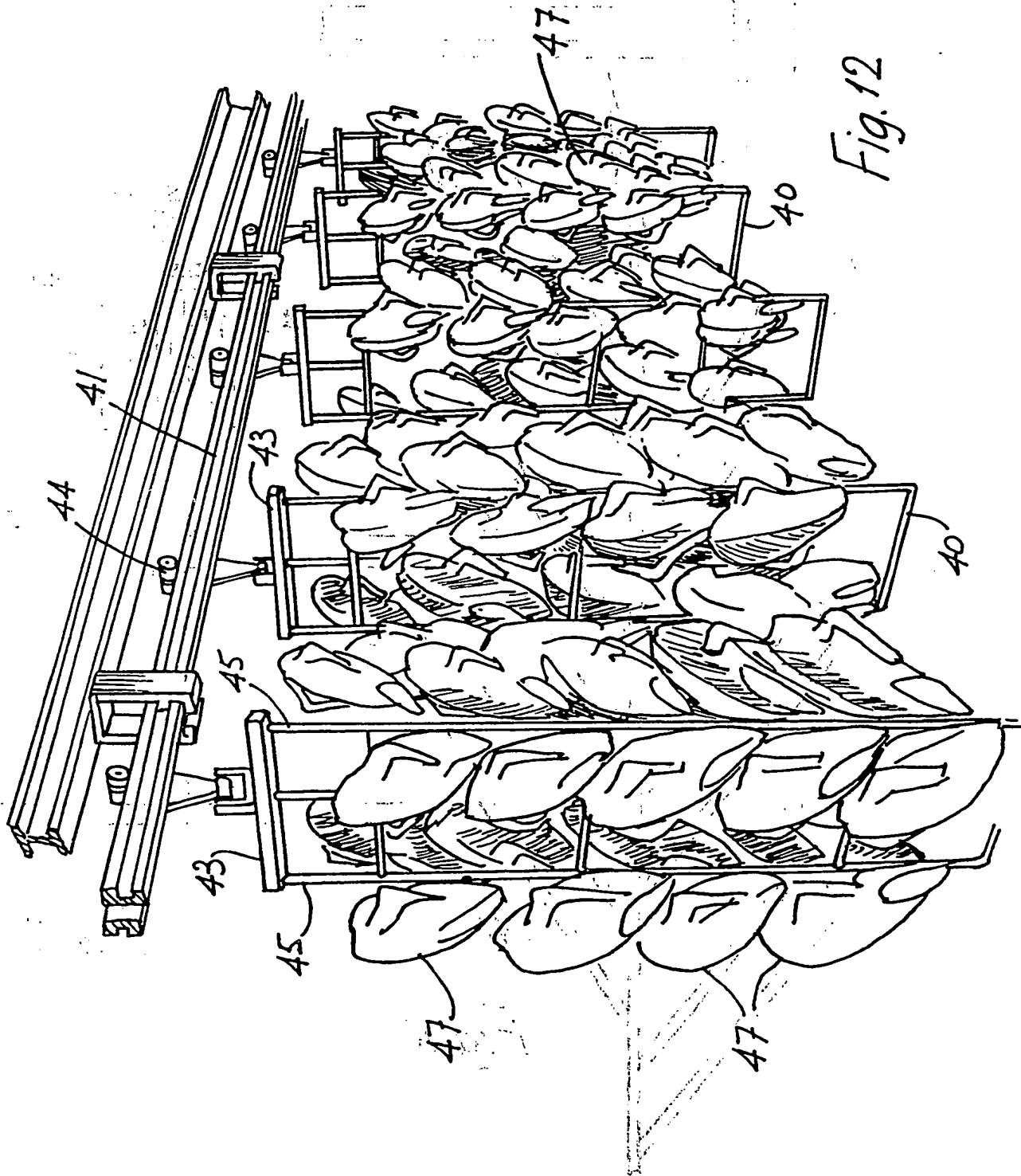
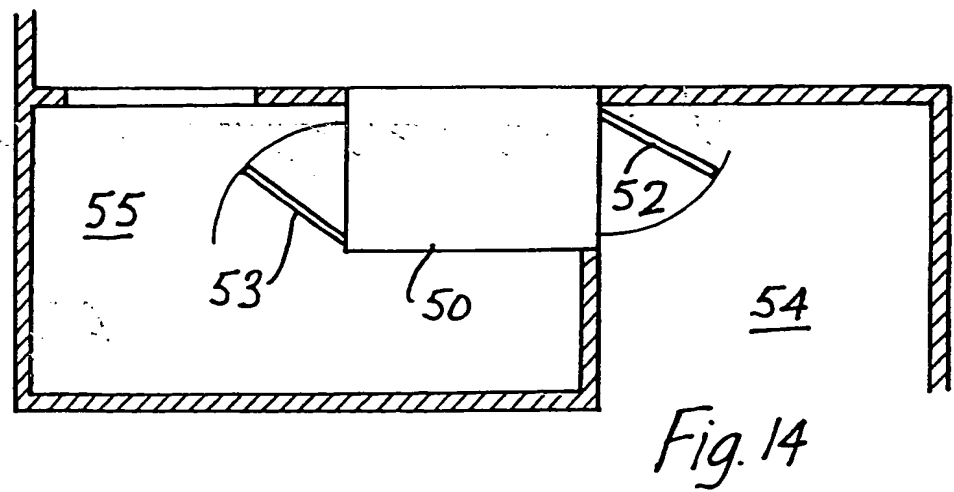
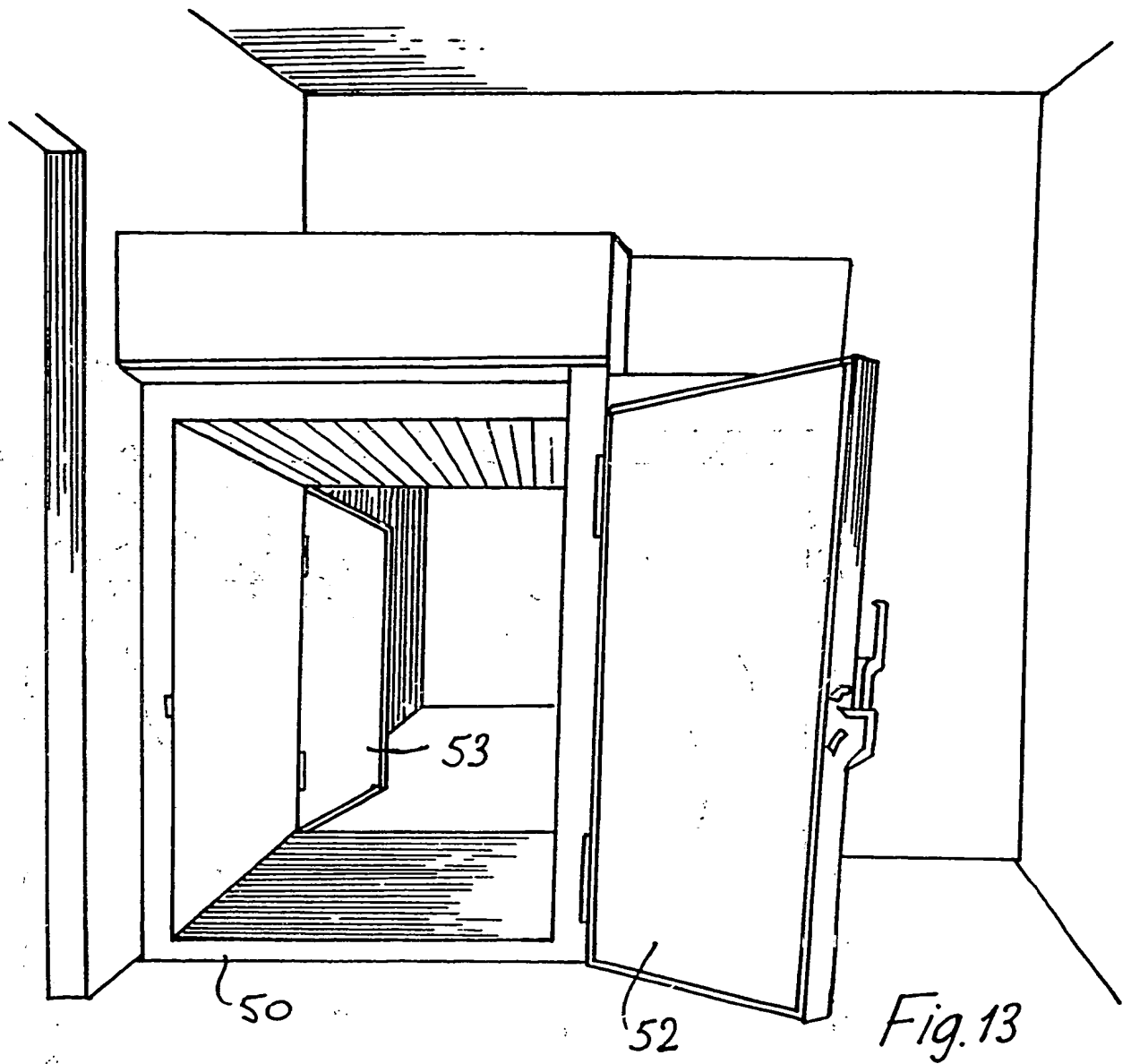


Fig. 12



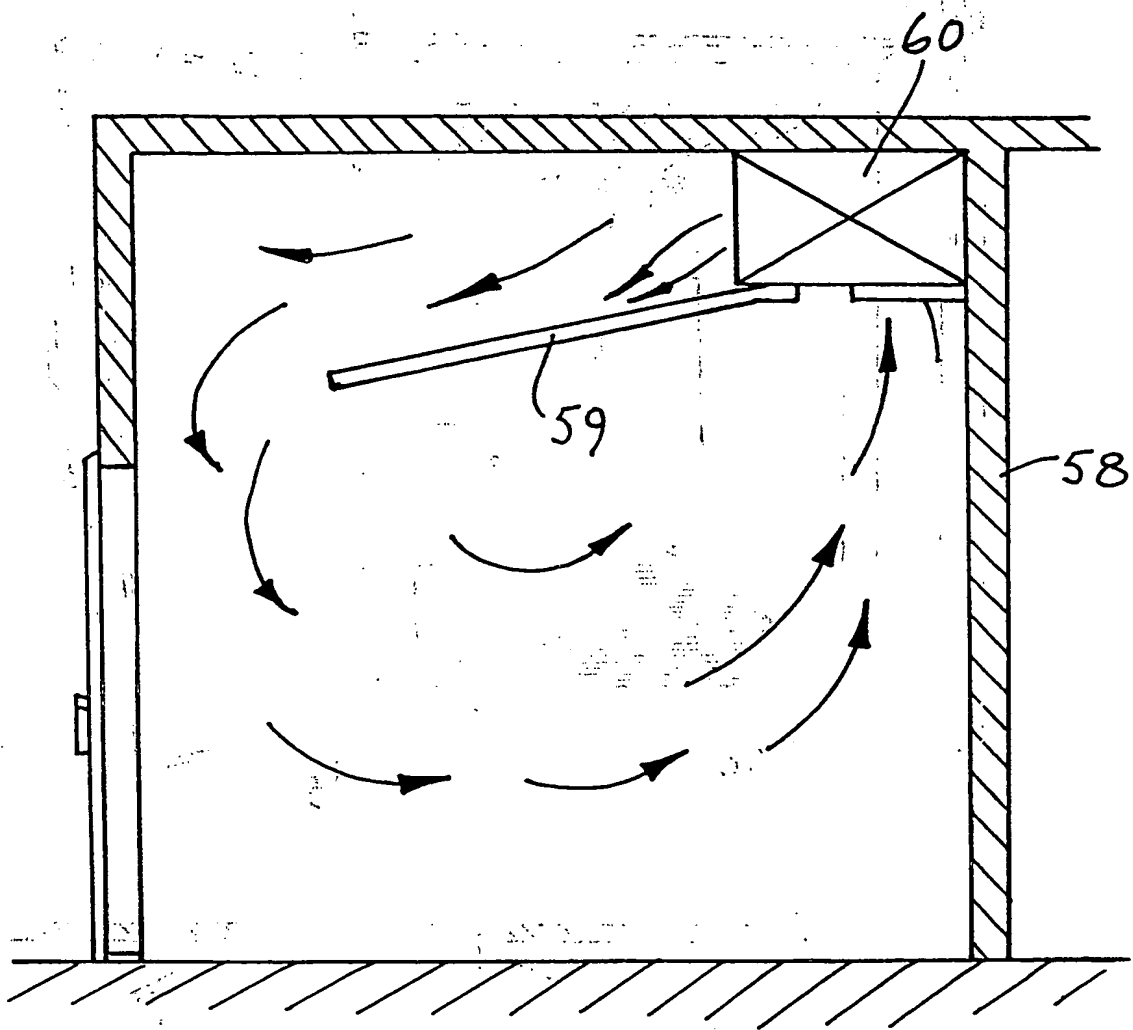


Fig. 15

- 1 -

"A Turkey Processing System"

This invention relates to a turkey processing system and apparatus.

According to the invention there is provided a turkey
5 processing system comprising the steps of:-

- (a) collecting live turkeys from a turkey farm by loading the turkeys into palletised containers, each container having a number of open-topped drawers for reception of turkeys;
- (b) delivering the turkeys to an inlet of a turkey processing
10 plant, removing the turkeys from the drawers and hanging the turkeys inverted on an endless conveyor;
- (c) stunning each turkey, slaughtering each turkey and passing the turkey over a bleed trough to drain blood from the turkey;
- 15 (d) scalding the turkey and passing the turkey through a plucking machine;

- (e) downstream of the plucking machine, removing the turkeys' legs, head and offal;
- (f) passing each turkey through a washer to clean the turkey in a water spray;
- 5 (g) allowing the turkey to partially drip-dry whilst delivering the turkey to a trussing table having an open top surface to allow further draining of water from the turkey whilst trussing the turkey;
- (h) mounting a number of the turkeys spaced-apart on a hanger
10 suspended from an endless conveyor rail;
- (i) delivering a number of the hangers carrying turkeys to a blast chill room and circulating cool air around the turkeys to chill the turkeys; and
- (j) removing the chilled turkeys from the chill room and
15 packaging the turkeys.

In one embodiment of the invention the packaging comprises the steps of:-

- (a) inserting each chilled turkey into a plastics bag and sealing the bag tightly around the turkey;

- (b) loading a pair of bagged turkeys into an outer plastics bag;
- (c) flushing the outer bag with carbon dioxide and sealing the outer bag; and
- 5 (d) mounting one or more of the outer bags in a protective cardboard box.

In another embodiment the process includes the further steps prior to packaging of:-

- 10 (a) deboning each turkey and mounting the deboned turkey within a closed metal container;
- (b) mounting a number of the containers on a trolley and delivering the trolley to a double-ended oven having an inlet and an outlet which open into separate rooms, entering through an inlet end of the oven;
- 15 (c) cooking the turkeys in the oven then removing the cooked turkeys through an outlet end of the oven;
- (d) spraying the containers with water to pre-cool the turkeys and delivering the trolley to a second blast chill room to further cool the turkeys to a pre-set
- 20 desirable temperature; and

- (e) delivering the trolley to a packing station, removing each turkey from its container and vacuum packing the turkey in a plastics wrapper.

In another aspect the invention provides apparatus for carrying out the process as described above, the apparatus comprising a stainless steel trussing table having a table top mounted on ground-engaging legs, the table top being formed by a grid having an outer frame on which are mounted a number of spaced-apart substantially parallel bars.

- 10 Preferably a drip tray is mounted on the legs beneath the table top, the drip tray being inclined to direct collected liquid to an outlet for discharge to a drain.

In a further embodiment apparatus for carrying out the process comprises a stainless steel hanger having a frame with a roller at its upper end for complementary engagement with a conveyor rail, each frame having a pair of spaced-apart upright bars each of which supports a number of spaced-apart hooks arranged in a staggered formation between a top and a bottom of each bar.

- 20 Preferably each hook comprises an elongate U-shaped member extending outwardly and upwardly of the bar.

The invention will be more clearly understood by the following description of some embodiments thereof, given by way of example only, with reference to the accompanying drawing in which:-

5 Fig. 1 is a flow chart illustrating a turkey processing system according to the invention;

 Fig. 2 is a perspective view of a palletised container for transporting live turkeys;

10 Fig. 3 is an elevational view of the palletised container;

 Fig. 4 is a detail elevational view of portion of the palletised container;

 Fig. 5 is a perspective view of a drawer forming portion of the palletised container;

15 Fig. 6 is a perspective view of a turkey trussing table according to the invention;

 Fig. 7 is an elevational view of the trussing table;

 Fig. 8 is a sectional view along the line VIII-VIII of

Fig. 7;

Fig. 9 is a perspective view of hangers for the turkeys according to another embodiment of the invention, mounted on a conveyor rail;

5 Fig. 10 is a detail side elevational view of portion of a hanger mounted on a conveyor rail;

Fig. 11 is a detail partially sectioned elevational view showing the mounting of each hanger on the conveyor rail;

10 Fig. 12 is a perspective view showing a number of the hangers on a conveyor rail, the hangers being loaded with turkeys;

Fig. 13 is a perspective view of a double-ended oven used in the process;

Fig. 14 is a diagrammatic plan view of the oven; and

15 Fig. 15 is a diagrammatic side sectional elevational view of a blast chill room used in the process.

Referring to the drawings live turkeys are collected from a turkey farm 10 and delivered to an inlet of a turkey processing plant. For transport, the turkeys are loaded into palletised containers 12 (Fig. 2) having a number of open-

topped drawers 13 for reception of the turkeys. Each container 12 has a palletised base 14 carrying an upstanding open framework 15 on which the drawers 13 are slidably mounted. L-shaped tracks 16 on the frame 15 slidably engage rebates 17 at bottom corners of each drawer 13 extending along each side of the drawer 13. Fastening means (not shown) is provided to secure the drawers 13 in the closed position. Conveniently each container 12 can be positioned within the turkey house and turkey handlers can pull out a drawer 13 to open the drawer 13 and load one or more turkeys within the drawer 13 and then close the drawer 13 to secure the turkeys within the container 12. In this way the container 12 can be quickly and easily filled with turkeys. Advantageously the turkeys are not stressed as they are dropped into each drawer 13 and the drawers 13 are of sufficient depth not to cramp the turkeys, again avoiding stressing the turkeys. Filled containers 12 are loaded onto the bed of a collection truck for delivery to a turkey processing plant.

At an inlet 20 of the processing plant, the turkeys are removed from the containers 12 and hung upside-down on hooks of an endless conveyor (not shown). Again the turkeys can be quickly and easily lifted out of each drawer 13 because of the top opening. On the conveyor, the turkeys are passed over an electrified water bath 24 allowing the head of the turkey to dip into the water to stun the turkey. Stunned turkeys are immediately slaughtered and passed over a bleed trough 25 which collects the blood from each turkey.

10 Downstream of the bleed trough 25 each turkey is delivered through a scalding tank 26 and then through automated pluckers 27 to remove the feathers from the turkey. After plucking, the turkeys are removed from the conveyor which returns to the inlet 20 of the processing plant.

15 Each turkey is then suspended from a second endless conveyor and passed around a number of gutting stations 28 where the offal is removed and the feet and head of the turkey are removed. After gutting, the turkeys are delivered through a spray wash 29.

20 Downstream of the spray wash the turkeys are delivered to a trussing table 30 (Figs. 6-8) allowing the turkey to partially drip dry as it is delivered to the trussing table 30.

The trussing table 30 is of stainless steel and has a table top 31 mounted on ground engaging legs 32. Advantageously the

table top is formed by a grid having a rectangular outer frame 33 on which are mounted a number of spaced-apart substantially parallel bars 34. Extending beneath the table top 31 and supported by the legs 32 is a drip collection tray 35. The
5 drip tray 35 is inclined downwardly towards an outlet 36 for delivery of collected water through a run-off pipe 37 to a drain 38. It will be appreciated that, as the turkeys are being trussed on the table 30, water from the turkeys can drain away thus helping to dry the turkeys which improves
10 subsequent chilling of the turkey. With a conventional table the water draining from the turkeys would collect on the table top, the turkeys resting in a pool of water while they are being bound.

The bound turkeys are then loaded on hangers 40 (Fig. 9)
15 suspended from an endless conveyor rail 41 which passes through a blast chill room 42. Each hanger 40 has a frame 43 with rollers 44 provided at an upper end of the frame 43 for engaging the endless conveyor rail 41 along which the hangers 40 are directed. The frame 43 has a pair of spaced-apart
20 upright bars 45 each of which supports a number of spaced-apart hooks 46 arranged in a staggered formation between a top and bottom of the bars 45. Each hook 46 is formed by an elongate U-shaped member extending outwardly and upwardly of the bar 45 to which it is attached. Advantageously turkeys 47
25 can be mounted on the hangers 40 in a manner which allows good air circulation to all parts of the turkey facilitating rapid and even cooling of the whole bird (see Fig. 12). When the

turkeys have been reduced to the required temperature they may be delivered to either a packaging station 48 for immediate packaging or they may be delivered to a cooking station 49 for cooking the birds prior to packaging.

5 Those turkeys delivered directly to the packaging station 48 are each placed in a plastic bag which is wrapped tightly around the turkey. A pair of bagged turkeys are then packaged in an outer plastic bag which is flushed through with carbon dioxide prior to receiving the outer bag. This procedure
10 improves the shelf life of the turkeys. The turkeys are then mounted in boxes and delivered to a cold store to await delivery to consumers.

The turkeys delivered to the cooking station 49 pass firstly to a cutting room 50 where the turkeys are deboned and mounted
15 in sealed metal containers (not shown) which correspond to the shape of the birds. A number of the containers are then stacked on a trolley. The trolley is then wheeled into a double-ended oven 51 (see Figs. 13 and 14), having an inlet door 52 and an outlet door 53 which open into separate rooms
20 54, 55, the trolleys entering through the inlet door 52. After cooking the turkeys, the trolley is removed from the oven 50 through the outlet door 53 and showered at 57 with cold water to rapidly cool the turkeys. After showering, the trolley is delivered to a second blast chill room 58 (see Fig.
25 15). A baffle 59 is provided in the blast chill room to promote good air circulation from a cooler 60 around the blast

chill room 58 for rapid chilling of the turkey. When chilled to the required temperature the trolley is delivered to a packing area where the turkeys are removed from the containers and vacuum packed in a plastic wrapper. The turkeys are then

- 5 boxed and delivered to a cold store to await dispatch.

Advantageously the cooking station is arranged to prevent communication between the areas in which cooked turkeys are handled and areas in which the raw birds are handled for good hygiene.

- 10 The invention is not limited to the embodiments hereinbefore described which may be varied in both construction and detail.

CLAIMS

1. A turkey processing system comprising the steps of:-

- 5 (a) collecting live turkeys from a turkey farm by loading the turkeys into palletised containers, each container having a number of open-topped drawers for reception of turkeys;
- 10 (b) delivering the turkeys to an inlet of a turkey processing plant, removing the turkeys from the drawers and hanging the turkeys inverted on an endless conveyor;
- (c) stunning each turkey, slaughtering the turkey and passing the turkey over a bleed trough to drain blood from the turkey;
- 15 (d) scalding the turkey and passing the turkey through a plucking machine;
- (e) downstream of the plucking machine, removing the turkeys' legs, head and offal;
- (f) passing each turkey through a washer to clean the turkey in a water spray;
- 20 (g) allowing the turkey to partially drip-dry whilst

delivering the turkey to a trussing table having an open top surface to allow further draining of water from the turkey whilst trussing the turkey;

5 (h) mounting a number of the turkeys spaced-apart on a hanger suspended from an endless conveyor rail;

(i) delivering a number of the hangers carrying turkeys to a blast chill room and circulating cool air around the turkeys to chill the turkeys; and

10 (j) removing the chilled turkeys from the chill room and packaging the turkeys.

2. A system as claimed in claim 1 wherein the packaging comprises the steps of:-

(a) inserting each chilled turkey into a plastics bag and sealing the bag;

15 (b) loading a pair of bagged turkeys into an outer plastics bag;

(c) flushing the outer bag with carbon dioxide and sealing the outer bag; and

20 (d) mounting one or more of the outer bags in a protective cardboard box.

3. A system as claimed in claim 1 wherein the process includes the further step prior to packaging of:-

(a) deboning each turkey and mounting the deboned turkey within a closed metal container;

5 (b) mounting a number of the containers on a trolley and delivering the trolley to a double-ended oven, the oven having an inlet and an outlet which open into separate rooms, entering through an inlet end of the oven;

10 (c) cooking the turkeys in the oven then removing the cooked turkeys through an outlet end of the oven;

(d) spraying the containers with water to pre-cool the turkeys and delivering the trolley to a second blast chill room to further cool the turkeys to a pre-set
15 desirable temperature; and

(e) delivering the trolley to a packing station, removing each turkey from its container and vacuum packing the turkey in a plastics wrapper.

4. A turkey processing system substantially as hereinbefore described with reference to the accompanying drawings.
5. Packaged turkeys whenever produced by the process as claimed in any preceding claim.
- 5 6. Apparatus for carrying out the process of any of claims 1 to 4, comprising a stainless steel trussing table having a table top mounted on ground-engaging legs, the table top being formed by a grid having an outer frame on which are mounted a number of spaced-apart substantially
10 parallel bars.
7. Apparatus as claimed in claim 6 wherein a drip tray is mounted on the legs beneath the table top, the drip tray being inclined to direct collected liquid to an outlet for discharge to a drain.
- 15 8. A turkey trussing table substantially as hereinbefore described with reference to Figs. 6 to 8 of the drawings.
9. Apparatus for carrying out the process of any of claims 1 to 4 comprising a stainless steel hanger having a frame with a roller at its upper end for complementary
20 engagement with a conveyor rail, the frame having a pair of spaced-apart upright bars each of which supports a number of spaced-apart hooks arranged in a staggered

formation between a top and a bottom of each bar.

10. Apparatus as claimed in claim 9 wherein each hook comprises an elongate U-shaped member extending outwardly and upwardly of the bar.

- 5 11. A turkey hanger substantially as hereinbefore described with reference to Figs. 9 to 12 of the accompanying drawings.

**Examiner's report to the Comptroller under
Section 17 (The Search Report)**

Application number

9202999.0

Relevant Technical fields

(i) UK CI (Edition K) A1M; A2D; A2N

(ii) Int CL (Edition 5) A22B; A22C

Search Examiner

K J KENNETT

Databases (see over)

(i) UK Patent Office

(ii)

Date of Search

10 JUNE 1992

Documents considered relevant following a search in respect of claims

1-5

| Category (see over) | Identity of document and relevant passages | Relevant to claim(s) |
|------------------------|--|-------------------------|
| Y | GB 2000013 (RENEE) - Whole document | 1 |
| Y | GB 1372985 (ARMOHR) - Whole document | 1 |
| Y | GB 1188869 (STORK) - Whole document | 1 |
| Y | US 4667370 (BROCKINGTON) - Figure 1 | 1 |
| Y | US 4634594 (CAGLE) - Whole document | 1 |
| Y | US 3803669 (DILLON) - Column 1 lines 12-19 | 1 |
| Y | US 3750231 (SCHRENDER) - Claim 1 | 1 |

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